US Army Corps
of Engineers
Omaha District

South Platte River Basin

Cherry Creek Lake Sedimentation Studies Area-Capacity Report

Cherry Creek Lake
Denver, Colorado

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M.R.D. Sediment Memoranda No. 10

SYNOPSIS

The purpose of this report is to document changes in the storage capacity of Cherry Creek Lake between the original and the 1974 and 1988 surveys.

Gross storage capacity in Cherry Creek Lake has decreased from the original capacity of 126,800 acre-feet in 1957 to 122,842 acre-feet in 1988 (the year of the latest hydrographic survey). This amounts to a total storage reduction of 3,958 acre-feet, or an average of 127.7 acre-feet yearly. Between the two most recent surveys (1974 and 1988), however, the gross storage was reduced by 696 acre-feet, or an average of 49.7 acre-feet yearly.

For the flood control pool zone, the reduction of storage capacity has decreased from the original capacity of 111,667 acre-feet in 1957 to 110,037 acre-feet in 1988, or an average of 52.6 acre-feet yearly. Between the two most recent surveys (1974 and 1988), the flood control capacity has been reduced 275 acre-feet, averaging 19.6 acre-feet yearly.

The original deposition rate below the multipurpose pool elevation was originally projected to be 151 acre-feet per year. However, since 1957, the average deposition rate to date has been 75 acre-feet per year and averaged 30 acre-feet per year between 1974 and 1988. This differance between the projected and actual deposition rates below the multipurpose pool elevation is most likely attributable to low sediment inflows experienced during the late 1970's and early 1980's and to the fact that most deposition presently is occurring in the upper headwaters reach of the lake within the flood control pool zone. Long term deposition rates within the multipurpose pool zone are expected to increase to approximately 120 acre-feet per year as the headwaters reach achieves its sediment storage capacity and more of the deposition begins to occur below the multipurpose pool elevation.

INTRODUCTION

Background - Cherry Creek is an ephemeral tributary of the South Platte River. Cherry Creek Lake is located about 10 miles southeast from Denver, Colorado (See Plate 1). Major sediment inflows into the lake are sporadic and usually coincide with major summer storm events.

Cherry Creek Dam is a rolled earth dam 14,300 feet long and 140 feet high containing 13,000,000 cubic yards of fill material. The lake is 1.50 miles long with 5 miles of shoreline at the multipurpose pool elevation of 5550 feet m.s.l. Table 1 contains additional project information.

Purpose - The purpose of this report is to determine the loss of reservoir storage capacity in Cherry Creek Lake between the 1974 and 1988 surveys and to determine the accuracy of 1984 survey data.

Authorization - This report was prepared under the requirements of EM 1110-2-4000, Reservoir Sedimentation Investigations, and in response to federal, state and public concerns that storage capacity in Cherry Creek Lake is depleting faster than initially projected.

Resurveys - Complete resurveys of Cherry Creek Lake were completed in 1950, 1965, 1974, 1984, and 1988 (See Table 2).

PROCEDURE

Original reservoir surface areas for 5-foot incremental elevations were planimetered in segments (an area bounded by consecutive or adjacent range lines) from a topographic map. Planimetered surface areas and cross section data were evaluated using the following computer programs:

a. SCASO - sorts cross sections into sequential order and scans for obvious data errors.

b. SHELM - computes cross section width, area, average depth, and average bed elevation.

c. BPOINT4 - computes volumes between bounding segments from the original surface areas.

d. VOLRAT - computes ratios of original volumes to bounding cross sectional areas for reservoir segments or reservoir segment volumes by elevation increment.

e. WASTAB - prints out water and sediment volume tables.

f. VOLSURA - computes volumes and/or surface areas at one and one-one hundredth foot intervals.

g. CAPAC - prints out capacity tables at one and one-one hundredth foot increments and area-capacity tables at the same increments.

Program Execution - General procedures for executing these programs can be found in the manual "Omaha District Area-Capacity Program, April 1986".